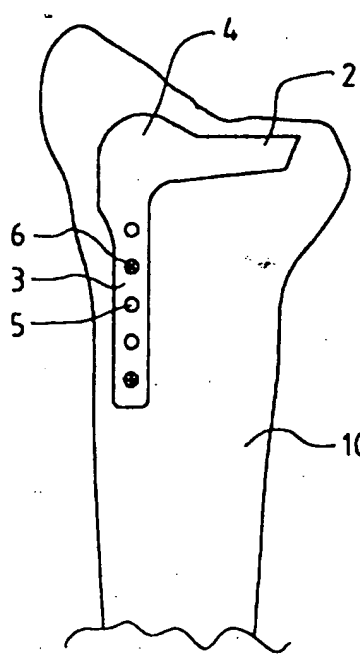


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<p>(21) International Application Number: PCT/SE96/00172 (22) International Filing Date: 12 February 1996 (12.02.96) (30) Priority Data: 9500566-6 14 February 1995 (14.02.95) SE (71) Applicant (for SE only): COLLUX AB [SE/SE]; Bronsåldersgatan 3, S-213 76 Malmö (SE). (71)(72) Applicant and Inventor: MEDOFF, Robert, J. [US/US]; 159 Ku'uukama Street, Kailua, HI 96734 (US). (74) Agents: MAGNUSSON, Gustav et al.; Magnupatent AB, P.O. Box 6207, S-200 11 Malmö (SE).</p>		<p>(81) Designated States: AL, AM, AT, AU, AZ, BB, BG, BR, BY, CA, CH, CN, CZ, DE, DK, EE, ES, FI, GB, GE, HU, IS, JP, KE, KG, KP, KR, KZ, LK, LR, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, TJ, TM, TR, TT, UA, UG, US, UZ, VN, ARIPO patent (KE, LS, MW, SD, SZ, UG), European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).</p> <p><b>Published</b> <i>With international search report.</i></p>
<p>(54) Title: L-PLATE</p> <p>(57) Abstract</p> <p>The present invention relates to an implantable buttress plate (1) for fixation of volar rim fragments (11) at the distal radius (10). The plate (1) is of L-shape with holes (5) in one or both of the legs of the L. The holes (5) are designed for receiving fastening means, e.g. bone screws (6). The plate (1) has a shape adapted to the intended use.</p> 		

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## L-PLATE

The present invention relates to an implantable buttress plate  
5 according to the preamble of the independent claim.

Frequently, fractures may involve the volar (palmar) portion of the distal radius including the volar rim. In some situations, such as the Barton's fracture, this type of fragmentation may be isolated, and contribute to volar (palmar) instability of the wrist as it displaces into  
10 the fracture site. In other fracture patterns, such as the comminuted Colles' fracture, volar fragmentation makes open reduction extremely difficult because of the lack of support of this rim. This may require multiple incisions if open reduction is attempted in order to reduce  
15 the dorsal fragmentation as well as re-establish a volar buttress for the wrist. This type of extensive soft tissue dissection, however, may further compromise the soft tissues.

Typically, the buttress plate use for the above volar fragments is designed having a "T" type configuration and involves dissection through  
20 the midline along the palmar side of the distal forearm. The buttress plate is attached to the proximal fragment; distally, the plate pushes against the rim fragments holding them into position.

25 The existing "T" buttress plates require a relatively long and extensive palmar exposure, retraction of the median nerve and radial vessels giving a relatively extensive bleeding. A further problem with this method is that in the presence of a comminuted Colles' fracture the surgeon is hesitant to have to make incisions from both the dorsal and  
30 the palmar side.

One objective of the present invention is to provide a device circumventing the above drawbacks. This will be attained by means of a buttress plate according to the characterizing part of claim 1.  
35

By using a buttress plate having an "L" type configuration according to the present invention, it is possible to apply the plate using a radial

incision, which is less traumatic. The incision is made smaller than for the traditional palmar approach.

Further objectives and advantages of the present invention will be apparent from the detailed description below.

Expedient embodiments of the present invention are disclosed in the dependent claims.

The present invention will now be described in greater detail hereinbelow, with the aid of embodiments shown in the drawings. In the accompanying drawings:

- Fig. 1 is a top view of a buttress plate according to the invention;
- Figs. 2 and 3 are end and side views, respectively, of the plate of Fig. 1;
- Figs. 4 and 5 are top and side sectional views, respectively, of the plate of previous Figures. applied on the radius; and
- Fig. 6 is a top view of a further embodiment of a buttress plate according to the invention.

One example of an embodiment according to the invention is shown in the Figures. The buttress plate 1 has a general L-shape in top view. The angle  $\alpha$  between the two legs 2,3 of the "L" is approx.  $90^\circ$ . One leg 3 of the plate 1 is furnished with a number of openings 5 for receiving fastening means 6. At the transition 4 between the two legs 2,3 of the plate 1 an enlarged area is furnished at the outer part of the transition 4. In other embodiments there is no such enlarged area. This transition zone 4 is intended for support at the flare of the radial styloid.

Both of the legs 2,3 are formed after the shape of the bone at which the plate 1 is fixed. The angle  $\alpha$  between the legs 2,3 may vary from 60° to 115° in different embodiments of the invention. However, an angle  $\alpha$  of approx. 75°-110° is the most common.

5

In Figs. 4 and 5 an example of application on the radius 10 is shown. The L-plate 1 is used in this example as a buttress for a palmar rim fragment 11 at the distal radius. To place the buttress plate 1 a limited incision is made along the radial side of the forearm. The base of the plate is slid up under the palmar soft tissue of the radius 10 to buttress the rim fragment 11.

When the plate 1 is in the desire position it is fixed to the radius 10 by means of suitable fastening means passing through openings 5 in one of the legs 3 of the L-plate 1. In the drawings the fastening means are shown as screws 6. In other embodiments the screws 6 are replaced by pins, wires, blades, staples, brackets or indirect coaption with another device securely attached to the stable bone fragment. Furthermore, a person skilled in the art appreciates that the number of apertures or holes for fixation of the plate 1 is not critical, as long as a stable fixation is achievable.

The leg 2 of the buttress plate 1 intended to support the palmar rim fragment 11 is bent in a shape adapted to the form of the styloid of the radius. Thus, said leg 2 has a curved shape which follows the end of the radius. The other leg 3 of the buttress plate 1 is made contoured for the radial side of the lower forearm. This allows a limited incision and makes it much easier for placement of the fastening means.

The embodiment shown in Fig. 6 corresponds to the embodiment shown in Figs. 1 to 5 except that holes 12 are provided also in the leg 2 of the buttress plate 1 intended to support the palmar rim fragment 11. This allows the placement of fastening means, e.g. screws, in the part 2 of the plate 1 abutting the volar or palmar rim of the distal radius.

35

In further embodiments pointed projections (not shown) are furnished at the ends of the plate. These pointed projections aid in purchasing the fragments that are buttressed, and prevent the fragments from shifting.

- 5 The above detailed description has referred to but a limited number of embodiments of the present invention, but it will be readily perceived by a person skilled in the art that the present invention encompasses a large number of embodiments without departing from the spirit and scope of the appended claims.

## CLAIMS

1. An implantable buttress plate (1) for fixation of a palmar or volar rim fragment (11) at the distal radius (10), c h a r a c t e r -  
5 i z e d in that the plate (1) is of L-shape as viewed from above.
2. The plate of Claim 1, c h a r a c t e r i z e d in that only one leg (3) of the "L" is furnished with one or more holes (5) for receiving fastening means (6) for securing the plate (1) to a stable  
10 bone (10).
3. The plate of Claim 1, c h a r a c t e r i z e d in that both legs (2,3) of the "L" are furnished with one or more holes (5,12) for receiving fastening means (6) for securing the plate (1) to a  
15 stable bone and/or bone fragments.
4. The plate of any of the preceding Claims, c h a r a c t e r -  
i z e d in that the area of the plate (1) is enlarged, as viewed from above, at the outer part of the transition (4) between the two  
20 legs (2,3) of the "L".
5. The plate of any of the preceding Claims, c h a r a c t e r -  
i z e d in that one leg (2) of the "L" is bent in a shape adapted to the form of the styloid of the radius (10).  
25
6. The plate of any of the preceding Claims, c h a r a c t e r -  
i z e d in that it is designed for use through a single, limited incision along the radial side of the lower forearm.
- 30 7. The plate of any of Claims 2-6, c h a r a c t e r i z e d in that the fastening means are screws (6), pins, wires, blades, staples, brackets or indirect coaption with another device securely attached to the stable bone (10).
- 35 8. The plate of any of the preceding Claims, c h a r a c t e r -  
i z e d in that the angle ( $\alpha$ ) between the two legs (2,3) of the "L" is from 60° to 115°.

6

9. The plate of any of Claims 1 to 7, characterized in that the angle ( $\alpha$ ) between the two legs (2,3) of the "L" is from 75° to 100°.

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10. The plate of any of the preceding Claims, characterized in that the ends of the plate (1) are furnished with pointed projections.

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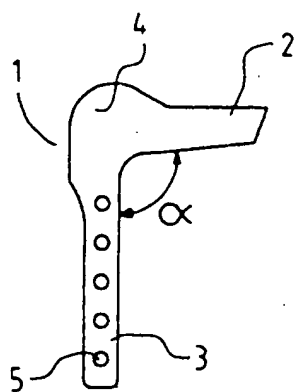


Fig. 1

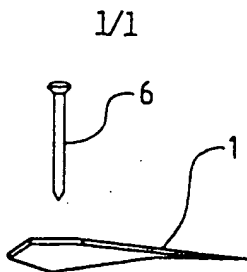


Fig. 2

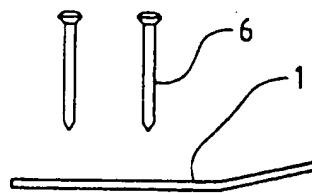


Fig. 3

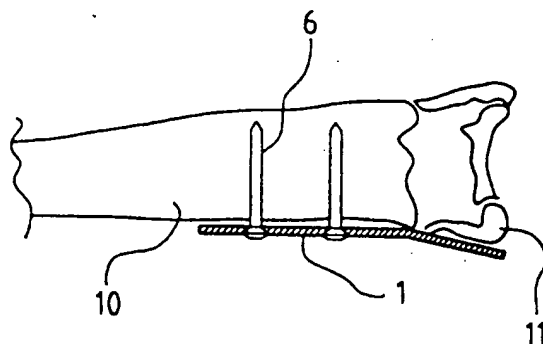


Fig. 5

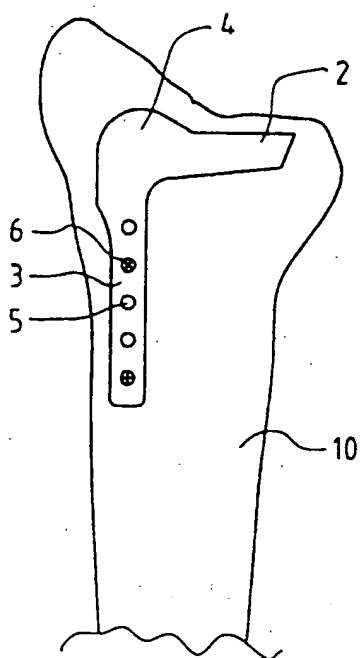


Fig. 4

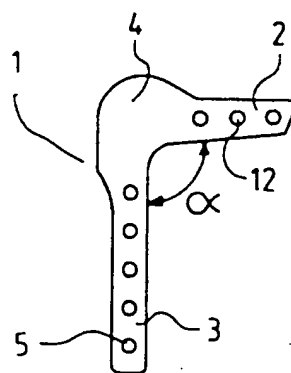


Fig. 6

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 96/00172

## A. CLASSIFICATION OF SUBJECT MATTER

IPC6: A61B 17/84

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC6: A61B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	FR 2472373 A (ETABLISSEMENTS TORNIER), 3 July 1981 (03.07.81), page 1, line 11 - line 14; page 1, line 27 - line 39, figure 1 --	1-10
X	FR 2405705 A (DAYAN ROBERT GABRIEL), 11 May 1979 (11.05.79), page 1, line 36 - page 2, line 6; page 2, line 38 - page 3, line 9, figures 4,6 --	1-10
X	FR 2405062 A (DAYAN ROBERT GABRIEL), 4 May 1979 (04.05.79), figures 8,9,10,29, claim 1 --	1-10

☒ Further documents are listed in the continuation of Box C.☒ See patent family annex.

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## C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4565193 A\$ (ELKE STRELI), 21 January 1986 (21.01.86), column 2, line 28 - line 30, figure 2, abstract  -- -----	1-10

# INTERNATIONAL SEARCH REPORT

Information on patent family members

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International application No.

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
FR-A- 2472373	03/07/81	NONE	
FR-A- 2405705	11/05/79	NONE	
FR-A- 2405062	04/05/79	NONE	
US-A5- 4565193	21/01/86	AT-A- 378324	25/07/85
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		GB-A, B- 2126903	04/04/84